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Meta-Analysis > Environ Health. 2011 Jun 17;10:59. doi: 10.1186/1476-069X-10-59.

Mobile phones and head tumours. The discrepancies in cause-effect relationships in the epidemiological studies - how do they arise?

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PMID: 21679472 PMCID: PMC3146917 DOI: 10.1186/1476-069X-10-59

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Abstract

Background: Whether or not there is a relationship between use of mobile phones (analogue and digital cellulars, and cordless) and head tumour risk (brain tumours, acoustic neuromas, and salivary gland tumours) is still a matter of debate; progress requires a critical analysis of the methodological elements necessary for an impartial evaluation of contradictory studies.

Methods: A close examination of the protocols and results from all case-control and cohort studies, pooled- and meta-analyses on head tumour risk for mobile phone users was carried out, and for each study the elements necessary for evaluating its reliability were identified. In addition, new meta-analyses of the literature data were undertaken. These were limited to subjects with mobile phone latency time compatible with the progression of the examined tumours, and with analysis of the laterality of head tumour localisation corresponding to the habitual laterality of mobile phone use.

Results: Blind protocols, free from errors, bias, and financial conditioning factors, give positive results that reveal a cause-effect relationship between long-term mobile phone use or latency and statistically significant increase of ipsilateral head tumour risk, with biological plausibility. Non-blind protocols, which instead are affected by errors, bias, and financial conditioning factors, give negative results with systematic underestimate of such risk. However, also in these studies a statistically significant increase in risk of ipsilateral head tumours is quite common after more than 10 years of mobile phone use or latency. The meta-analyses, our included, examining only data on ipsilateral tumours in subjects using mobile phones since or for at least 10 years, show large and statistically significant increases in risk of ipsilateral brain gliomas and acoustic neuromas.

Conclusions: Our analysis of the literature studies and of the results from meta-analyses of the significant data alone shows an almost doubling of the risk of head tumours induced by long-term mobile phone use or latency.

Figures

Figure 1 Hardell and Interphone data: percentage...

Figure 2 Data from Hardell and Interphone...

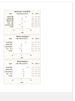

Figure 3 Meta-analyses on data on gliomas...

Figure 4 Meta-analyses on data on meningiomas...

Figure 5 Meta-analyses on data on acoustic...

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